years will elapse before the undertaking can be brought to a conclusion.

On looking down the list of contributors whose services have been already secured for "Das Tierreich," we see, as might have been expected, that they are mostly Germans. But a certain number of English and French naturalists, and some from America and Italy, have already given their adhesion to the plan, and have undertaken to furnish certain portions.

The language employed will be, as a rule, German, but contributions in English, French, and Latin will also be received.

In order to show the general style of the proposed work, Messrs. Friedländer and Son send out along with the prospectus a synopsis of the small group of *Heliozoa*, prepared by Dr. Fritz Schaudinn, of Berlin. So far as we can judge from this portion of the work, the information which it is proposed to give will be exactly what is required for such a manual, and the whole work, if carried out upon this plan, will be of the greatest value to zoologists.

One little criticism we may venture to make on the proposal. The title, we think, is not a very well-chosen one. Bronn's well-known and important work ("Die Klassen und Ordnungen des Thierreichs") has already monopolised the selected name, although in Bronn's days the new mode of writing it had not been introduced. A good Latin title, such as "Synopsis" or "Index Animalium" would have been better, and would have given to the work a more cosmopolitan character. Indeed, we believe that it would have been much better to have used Latin throughout the work, as the common language of science. There are many working naturalists in France, Italy, America, and England who do not understand German. But every one who has been to school acquired sufficient knowledge of Latin to understand a Latin diagnosis. And the proposed work will consist mainly of diagnoses.

NOTES.

The first of the two annual conversaziones of the Royal Society will take place on Wednesday, May 6. This is the conversazione to which gentlemen only are invited.

Mr. W. C. McDonald has just given the McGill University, Montreal, further reason to be grateful for his unbounded generosity. We understand that he has offered to build and equip a building for chemistry and mining on the same scale as the engineering and physics buildings, which the University owe to his munificence, involving a cost of about £52,000. In addition to this, he has decided to found a chair of Mining Engineering and a chair of Architecture, and has added the sum of £31,000 to the endowment of the University. The completeness and liberality with which the physics and engineering departments of the McDonald buildings are equipped may be judged from an article which appeared in these columns in 1894 (vol. l. p. 558). We cherish the hope that Mr. McDonald's generous benefactions will create a spirit of emulation among those who are able to advance scientific education and research in this country by providing the necessary means.

The well-known American naturalist, Mr. D. G. Elliot, and party left London for Somaliland on the 27th ultimo. The object of Mr. Elliot's expedition is to obtain a series of antelopes and other larger African mammals for the Field Columbian Museum of Chicago. Mr. Elliot had originally intended to go to Mashonaland for this purpose, but the recent troubles in South Africa induced him to change his plans. He will land at Berbera, and proceed southwards over the high plateau to the Shebeyli River, where he expects to find giraffes and Grévy's zebras. Mr. Elliot will endeavour to return to the coast by the valley of the Juba River, in order to procure examples of the recently-described Hunter's antelope (*Damaliscus hunteri*). Mr. Elliot takes with him a taxidermist from Chicago, and has secured in London the services of Mr. Dodson, who accompanied Dr. Donaldson Smith during his recent adventurous expedition in Lake Rudolph.

The Liverpool Marine Biological Station at Port Erin is now quite full. The naturalists who have gone there to work, for the Easter vacation, are Prof. G. Gilson (Louvain), Mr. Arnold Watson (Sheffield), Mr. E. T. Browne (University College, London), Prof. Weiss, Mr. Gamble, Mr. Burtt, and Mr. Mellor (from Owens College, Manchester), Mr. Kermode (Ramsey), Mr. Clubb (Liverpool Museum), Mr. C. E. Jones and Prof. Herdman (University College, Liverpool). Several students from University College, Liverpool, are expected later. The tides have been exceptionally low, the weather is good, and the Committee have arranged several dredging expeditions, one of which will be to the deep water between the Isle of Man and Ireland.

The death is announced of Mr. George Holt, who endowed the chair of Physiology in University College, Liverpool, and contributed altogether about £25,000 to the resources of the College.

One of the New York medical colleges has already incorporated instruction in the use of X-rays in surgery as a part of its regular curriculum.

Amongst the experiments on Röntgen X-rays made during the past month by Italian physicists, several contributions may be cited which either tend to confirm the results established by other workers, or to establish new results. Signor A. Roiti describes (*Atti R. Acad. Lincei*) a series of experiments now in progress bearing on the question as to where these rays emanate. The principal conclusions arrived at are: (1) That fluorescence does not necessarily accompany the emission of X-rays; (2) that the rays are only emitted when kathodic rays impinge on certain substances, notably glass, aluminium, mica, platinum, and porcelain. Signor Roiti establishes some interesting results relating to the leakage of electricity which takes place when X-rays fall on a charged body. When the body in question is placed in a vessel from which air is exhausted, this leakage effect is found to diminish rapidly after the pressure falls below a certain limit, showing that the leakage effect depends on the presence of molecules, by which electricity is conducted from the charged body to the containing vessel.

Our American correspondent writes, under date March 27:—"Reports are received of the favourable action of the Senate Committee with reference to the proposed National University, preliminary appropriations being recommended for 1897 and 1898. This measure is one which has often heretofore been broached at Washington, and has been so often deferred as to seem to many a hopeless scheme. Present indications, however, point to some real progress, and encourage the hope that something will at last be accomplished.—Progress in science seems to pervade all departments of the Government. Another notable move is the introduction into the Post-office at Washington, of cancelling stamps which indicate every day the weather forecast, and of course the stamps are changed from day to day. This scheme will be put in operation within a few weeks.

"The site selected for the new free public library of New York, which has recently been so amply endowed, including the Astor and Lenox libraries and the Tilden bequests, is that of the old reservoir on the corner of Fifth Avenue and West Forty-second Street. At a public hearing before the

Mayor of New York, on March 25, the choice was approved by him; and application will be made to the Legislature for permission to use this site, which will no doubt be granted, as the old reservoir is now disused.

"THE annual exhibitions of the New York Academy of Sciences are now the scientific event of the year. The third annual exhibition was held on March 26, at the American Museum of Natural History. As a matter of course, the display of radiographs and radiographic apparatus attracted the most attention, and the lecture of the evening was by Prof. Pupin on the X-rays. A large and interesting array of exhibits was made in other departments. As space forbids any systematic report, a few salient features include the following: The new elements, argon and helium, were shown by electrical illumination, and their spectra exhibited. The astronomical exhibit included fine photographs of star clusters, and spectra of stars, planets, &c. A photograph was shown of a meteor trail at Arequipa, Peru, September 6, 1895. Improved apparatus for investigations in astronomy, physics, and experimental psychology included many novelties. A series of pictures giving restoration of extinct mammals was pronounced by palæontologists the most complete and accurate ever made. The exhibits in geology, mineralogy, and botany were numerous and interesting. President John I. Stevenson made a brief address, appealing to citizens of New York to move in the matter of securing a permanent home for the Academy.

"MR. BRYAN LAWRENCE, who died at New York, March 10, left a large number of bequests to various Roman Catholic charities, including several educational institutions. The larger educational bequests are 5000 dols. each to the American College at Rome, Italy, the R.C. Seminary, Westchester County, N.Y., and the American University (R.C.) at Washington, D.C.—Brigadier-General Thomas L. Casey, retired, for many years chief of engineers of the United States Army, dropped dead in the new congressional library building at Washington, March 25. He was engaged in superintending the construction of the building. The Washington monument, 555 feet high, being the highest structure in America, was completed by him some years ago, after a long delay in the work previous to his connection with it. General Casey was a Fellow of the American Association for the Advancement of Science.

"A NOVEL series of experiments is in progress at Wesleyan University, Middletown, Connecticut, to determine the nutritive and caloric value of food, and many other questions relative to nutrition and other vital processes. For this purpose a calorimeter is employed, consisting of a copper-lined box, measuring inside 7 × 4 × 6½ feet, thus giving 182 cubic feet of air, within which space a man is confined for several days at a time. It is fitted with glass windows of three thicknesses. Fifty litres of air per minute are pumped in. Food is passed in three times a day through an air-tight tube, and is carefully weighed, as are all the exudations and excretions, and the quantity of heat is measured. A telephone enables the subject to converse with the outer world. The experiments are conducted by Prof. Wm. O. Atwater, and the expense is shared by the Department of Agriculture of the United States, Wesleyan University, and the Storrs Experiment Station at New Bethel. A careful record is kept of every action of the subject—of his hours of sleep, minutes of exercise, respiration, appetite, &c. To this end there are two watchers and two assistants, a watcher, who is a professor in the university, and an assistant being constantly present."

AT the Royal Institution, on Tuesday next, April 14, Prof. James Sully will begin a course of three lectures on "Child-Study and Education"; on Thursday, April 16, Prof. Dewar will begin a course of three lectures on "Recent Chemical Progress"; and on Saturday, April 18, Prof. W. B. Richmond, R.A., will begin a course of three lectures on "The Vault of the Sixtine Chapel." The Friday evening meetings will be resumed on April 17, when Prof. G. Lippmann will deliver a discourse on "Colour Photography."

THE next course of Cantor Lectures at the Society of Arts will be delivered by Prof. Henry A. Miers, on Monday evenings, April 13 and 20, the subject being "Precious Stones." The points to be dealt with are: (1) The properties which make precious stones esteemed among minerals; (2) the properties by which precious stones are recognised; (3) the distinction of stones which may be confused, as garnet and ruby, jacynth and cinnamon-stone, zircon and lux sapphire, garnet and olivine, tourmaline and diopside, &c. The lecture will close with some remarks on artificial stones. Mr. James Swinburne will deliver a course of Cantor Lectures on "Applied Electro-Chemistry," on Monday evenings, April 27, May 4, 11, and 18. Among the papers arranged for the meetings of the Society after Easter are: April 22, "The Perfected Photochromoscope and its Colour Photographs," by Mr. F. E. Ives; April 29, "Fruit Drying or Evaporation," by Mr. E. W. Badger. Papers at subsequent meetings will be read by Captain Abney, on "Orthochromatic Photography"; by Mr. Hudson Maxim, on "High Explosives and Smokeless Powders"; and by Mr. E. W. Moir, on "Tunnelling by Compressed Air."

THE French Association for the Advancement of Science held its annual meeting at Tunis last week, about four hundred members being present. The office-bearers of the Association were received by the Bey on Wednesday, April 1; and the French resident, M. Millet, welcomed the Congress on the following day. The principal streets of Tunis were elaborately decorated in honour of the occasion, and, as hotel accommodation was limited, the Lycée Carnot was placed at the disposal of visitors. The Association met at Algiers fifteen years ago, so the recent meeting was the second one held on African soil. Next year's meeting will take place at St. Etienne.

ON Thursday, March 26, Prof. Guido Cora, of Turin, delivered a lecture on the "Gypsies" (*Gli zingari*), in the Aula Magna of the Collegio Romano in Rome, having been invited by the Società Palombella (founded for the higher education of women). The lecture was attended by the Queen of Italy, the Minister and the Under Secretary of State for Public Instruction. Prof. Guido Cora gave a short but complete history of the question, dealing also with many facts about the origin, manner and habits of the gypsies in every part of the world. He referred in high terms to many British scholars of the subject, and to the importance of the "Gypsy Lore Society" of Edinburgh.

THE twenty-seventh annual meeting of the Norfolk and Norwich Naturalists' Society was held in the Castle Museum on Monday, March 30, the President (Mr. H. D. Geldart) in the chair. Sir F. G. M. Boileau, Bart., was elected President for the coming session. In his annual address, Mr. Geldart discussed the subject of Arctic distribution of flowering plants, especially with reference to the influence of the glacial epoch upon the flora of the British Isles. He concluded his remarks by suggesting, as a simple and likely solution of the difficulties arising from the present distribution of Arctic and Alpine floras, that before the commencement of the glacial epoch, what is now commonly known as the "Scandinavian" flora, but which would be better called the "Arctic" flora, was distributed from land then existing in the neighbourhood of the Pole; that a part of this flora, being well established, had held its own without migration even to the present time, and that the hypothesis of destruction and migration of plants from north to south and back again was unnecessary to account for the actual facts of distribution.

In connection with M. Ragonneau's reported explanation of the "mango trick" of Indian native conjurers, it may be interesting to compare his results with Moggridge's observations on the harvesting ants of the Riviera. According to M. Ragonneau, the Indians sow the seed under experiment in earth which has been taken from an ants' nest, and the formic acid present causes it to germinate with extraordinary rapidity, and "grow up into a tree" before the astounded spectator. The French observer states that he has reproduced this experiment in every detail by sowing seeds in earth previously watered with a dilute solution of formic acid. On the other hand, Moggridge found that in seeds stored in the granaries of the Mediterranean ants the process of germination was indefinitely delayed. That their vitality was not destroyed was proved by removing and planting them in fresh earth, when they grew immediately. That ants should be capable of exerting such opposite influences on the growth of seeds is remarkable.

An interesting investigation on the specific heat of solutions has been given by Herr G. Tammann (*Zeitschrift für Physikalische Chemie*). It is well known that weak solutions of certain electrolytes have a smaller capacity for heat than the water present in them possessed previously to the introduction of the salt, and the object of the investigation is to establish a connection between this phenomenon and the contraction of volume which accompanies the process of solution. This contraction has often been accounted for by the hypothesis of a certain internal molecular pressure. Herr Tammann calculates the specific heat of the water present in a number of solutions of this class on the supposition that their pressure is the *increased* pressure postulated by the above theory, and he also calculates the specific heat of the dissolved substance, that of the mixture being deduced by adding the thermal capacities of the two components. The theoretical values thus obtained are found to agree closely with the values experimentally found by observing the solutions themselves, and it is inferred that contraction is the sole cause of the diminution of specific heat arising from the presence of the dissolved matter.

As an addition to the information about Northern Norway, contained in Dr. Reusch's article in Nature of March 5, we give the following data as to cloudiness, communicated to Mr. Lawrence Rotch by Prof. H. Mohn, Director of the Norwegian Meteorological Institute, and sent by him to *Science*. Prof. Mohn writes: "For Sydvaranger, the nearest place to Vadsö at which meteorological observations have been made, the amount of cloud on a scale of 0 to 10, and the chance in percentages of its occurrence are as follows:—

August 8, 8 p.m.			August 9, 8 a.m.	
Amount of cloud.	Chance.		Amount of cloud.	Chance.
10	45·5	...	10	45·5
8	13·7	...	9	9·1
7	4·6	...	8	4·6
5	4·5	...	7	9·1
3	9·1	...	6	4·5
2	4·5	...	4	4·6
0	18·2	...	3	4·5
			2	9·1
			0	9·1
	100·1			100·1

Sydvaranger lies on the south side of the Varangerfjord, and Elvenes is the name of the posting station. Vardö, lying on the north side, is not to be recommended, having too often fog or clouded sky. In the interior of Finmarken the sun is lower than at Varangerfjord." Although the astronomical conditions of low altitude of sun and short totality are not good, yet Mr. Rotch thinks the meteorological conditions just noted compare favourably with those of stations in Japan, where the eclipse occurs later in the day and totality lasts longer.

From materials collected by the Meteorological Office from merchant ships' logs since the year 1854, from data contained in the logs and Remark Books of the Royal Navy since 1830, and from other sources, the Meteorological Council have prepared monthly current charts for all oceans, which will certainly prove of much value to navigators. The Hydrographic Office of the Admiralty has undertaken to generalise the large amount of material which has been collected, and already the charts for the Indian Ocean have been published. These generalised sheets show the average direction and rate of the currents, and other details; much valuable information has hitherto been masked by the grouping of the data for longer periods. They show, for instance, that near the African coast there is no month between January and July in which the rate of the Agulhas current does not occasionally reach 100 miles in 24 hours, and also that it follows very different routes after reaching the latitude of the Cape. The currents of the Bay of Bengal are shown to be subject to very abrupt changes with the change of the monsoon, but do not follow the precise direction that might be expected. In January there is a well-marked southerly drift near the coast, while in February the current assumes an entire change of direction, and sets to the northward. Similarly, important changes are shown to exist in the current round the southern part of Ceylon.

An ingenious and novel method, which it is hoped may prove of service in distinguishing genuine cholera-vibrios from their numerous rivals, has been recently introduced by Prof. Pfeiffer and Dr. Vagedes. Taking advantage of the now recognised fact, that the serum derived from cholera-immunised animals contains anti-cholera substances, Dr. Pfeiffer has traced the effect produced outside the body from cholera-vibrios when brought into intimate contact with such serum in artificial cultures. For this purpose broth, to which highly active cholera-serum was added, was inoculated with cholera-vibrios, and the effect watched under the microscope in hanging-drop cultures. The vibrios, usually so active, were almost immediately deprived of their powers of movement, and after twenty minutes' exposure to a higher temperature in the incubator, all traces of motility had vanished, although no morphological difference could be discovered in their appearance. When, however, such drop cultures were allowed to remain for twenty-four hours in the incubator, the vibrios were found to have almost completely regained their old activity, indicating that the original inimical effect produced by the serum had to a great extent been overcome. Dr. Pfeiffer states that this remarkable influence of the cholera-serum was only apparent with true cholera-vibrios, all the other numerous descriptions of allied vibrios which were examined being totally unaffected. Further extensive trials must be made before passing a final opinion upon this new method of cholera diagnosis, and Dr. Pfeiffer has expressed his willingness to assist all such investigations by supplying cholera-serum of the requisite degree of strength, to those who desire to carry out similar experiments.

A short paper by Mr. H. W. Seton-Karr, on his discovery of evidences of the palæolithic stone age in Somaliland, appears in the latest number of the *Journal* of the Anthropological Institute (vol. xxv. No. 3, 1896). His observations show that stone implements in Somaliland are found scattered all over the country, but probably mostly below the present surface, within a district included roughly between the Red Sea and lat. 9° 30′ N., and between E. long. 44° and 45°. Dr. Gregory made a collection of obsidian implements in Masai-land, but these were all neolithic; and he points out that, as no palæolithic implements have been recorded from Tropical Africa previous to those described by Mr. Seton-Karr, if the identification of some of the specimens as palæolithic is verified, the discovery is a very important one.

In nearly every county of Central and Northern Indiana there occurs a kind of black soil, often spoken of as "bogus land." It is also sometimes called "alkali," but not correctly, for the land has none of the essential characteristics of alkali soil. The improvement of these hitherto unproductive black soils is the subject of a *Bulletin*, by Mr. H. A. Huston, published by the Agricultural Experiment Station of Purdue University, Lafayette, Indiana. It is asserted that thousands of acres of such soil are susceptible of amelioration to such an extent as to be made the most productive maize lands in the State. The use of straw or kainit has proved very profitable as a means of temporary improvement, but for permanent improvement a resort to efficient drainage—and that of a special kind—is essential. It is strongly recommended that, before incurring any other outlay, a preliminary survey of each area should be made, and the system of improvement determined according to the results of such survey.

Prof. H. G. Seeley, F.R.S., will begin the summer course of lecture-excursions with the London Geological Field Class at the end of April. The subject of the series will be the Physical Geography and Geology of the Thames and its Tributaries. This is the eleventh annual course. Mr. R. Herbert Bentley, 31 Adolphus Road, South Hornsey, N., is the hon. secretary to this society, which gives a systematic course of teaching in the open country.

The *Proceedings* for 1895 of the Agricultural Research Association, the organ of the Research Station, Glasterberry, Milltimber, Aberdeen, contain reports by the Director, Mr. Thomas Jamieson, on the securing of crops, on the permanence of manure, on the "furrow-system" of sowing grain, on the mechanical conditions of soils as affecting the growth of plants, on the mechanical analysis of soils, and on new manures.

The Danish Meteorological Institute has recently published a valuable series of observations made in the Isle of Denmark, Scoresby Sound, lat. 70° 27′ N., long. 26° 12′ W. From September 18, 1891, to July 31, 1892, meteorological observations were made every hour, under the direction of Mr. C. Ryder, the chief of the expedition. The mean temperature of the six months from November to April ranged between 1°·4 and −13°·9 F. From the beginning of May the cold began to diminish, and in July there was only a frost on one day. The absolute minimum occurred on March 7, when the thermometer fell to −52°, and the absolute maximum amounted to 58° on July 13. The wind was usually very light, while calms were very prevalent, amounting to about 80 per cent. Snow, and occasionally rain, fell on 131 days out of 318; neither hail nor thunderstorms occurred during the period of observation, but fog and mist were very frequent, especially between December and June. Aurora borealis occurred on 142 nights out of 183 between October and March; this phenomenon is made the subject of a special discussion.

The additions to the Zoological Society's Gardens during the past week include a Moustache Monkey (*Cercopithecus cephus*, ♂) from West Africa, presented by Mrs. Polini; two Rhesus Monkeys (*Macacus rhesus*, ♀ ♀) from India, presented respectively by Mr. C. Harmer and Mr. C. T. Trevalyan; a —— Boa (*Boa* ——) from Dominica, presented by Mr. W. Weldon Symington; a Barnard's Parrakeet (*Platycercus barnardi*) from Australia, deposited; a Raccoon-like Dog (*Canis procynides*) from Japan, two Elliot's Pheasants (*Phasianus ellioti*, ♂ ♀), two Bar-tailed Pheasants (*Phasianus reevesi*, ♂ ♀) from China, two Rosy-billed Ducks (*Metopiana peposaca*, ♂ ♂) from South America, purchased.

OUR ASTRONOMICAL COLUMN.

The Royal Observatory at Edinburgh.—The new Royal Observatory, which has been in course of erection on Blackford Hill, to the south of Edinburgh, during the last four years, was formally opened by the Secretary for Scotland, Lord Balfour, on Tuesday. A short article in the *Times* reminds us that the observatory owes its origin to the presentation to the Scottish nation by the Earl of Crawford of the splendid collection of instruments in his private observatory at Dun Echt, in Aberdeenshire, which was followed by the appointment of Dr. Ralph Copeland, the superintendent at Dun Echt, as Astronomer Royal for Scotland and Professor of Astronomy in the University of Edinburgh in 1889. As there was not sufficient accommodation for the new instruments in the old buildings on the Calton Hill, it was resolved to erect a new observatory worthy of the nation and of Lord Crawford's munificent gift. A Government grant of £33,000, afterwards increased to £36,000, was obtained, and the Town Council of Edinburgh granted on easy terms a site deemed in all respects suitable, on the eastern crest of Blackford Hill, which possesses exceptional stability, a convenient elevation, and unusual purity of atmosphere, the smoke nuisance intruding itself only in one day out of eighteen.

The buildings consist of the observatory proper, the official residence of the Astronomer Royal, the residence of the assistant astronomers, and subsidiary buildings. The observatory is a T-shaped building, the head of the T facing the north with a frontage of 180 feet, and having at each end a telescope tower, of which the eastern is 75 feet high and 40 feet in diameter, and the western is 44 feet by 27 feet. The former contains the most important instrument in the observatory—a new refracting telescope of 15-inch aperture. The latter contains the reflecting telescope, removed from the Calton Observatory, which has an aperture of 2 feet, and which is to be used in astro-physical researches.

Among the other instruments in the observatory are a meridian circle, 8½ inches in diameter; a self-recording anemometer; an ingenious chronograph; the telescope with which the late Prof. Piazzi Smyth made most of his observations on the Calton Hill; several good spectroscopes; a reversing transit instrument; and the clock, connected by wire with Greenwich, which fires the daily time-gun at Edinburgh Castle and drops the time-ball on the Nelson Monument. Connected with the observatory, there is a well-equipped photographic laboratory, and a library with accommodation for some 30,000 volumes, which is already well furnished with the treasures of the Dun Echt collection.

Comet Perrine-Lamp.—The Perrine-Lamp comet was observed at the Astro-Physical Observatory, South Kensington, on the 1st inst., and spectroscopic observations were made by Mr. Shackleton. On account of the faintness of the comet the spectrum was weak, but a fair amount of continuous spectrum was seen, with three maxima in the green blue, which in all probability correspond to the carbon bands, as they had the same relative positions; this, however, could not be verified by direct comparison.

BOGGIANI'S RECENT EXPLORATIONS AMONGST NATIVE TRIBES OF THE UPPER PARAGUAY RIVER.

The country along the upper course of the Paraguay has recently been attracting the attention of men of science. A short time ago naturalists were aroused by the wonderful discovery made by Dr. Bohls of *Lepidosiren paradoxa*, that rarest and strangest of fish, living in abundance in lagoons in the Lengua territory of the Gran Chaco, not very far from the right bank of the Paraguay.

I now intend to give a short account of the ethnological results of the explorations of an Italian artist, Cavaliere Guido Boggiani, who, little more than three years ago, lived amongst two of the less-known native tribes, further north, on both sides of the Paraguay River. They are the *Chamacocos* and the *Caduveos*. Boggiani brought home extensive ethnographical collections from both, which he has described in lectures delivered at Rome and Florence, recently published in elegant